

APPLICATION FOR UNITED STATES LETTERS PATENT

SPECIFICATION

TO ALL WHOM IT MAY CONCERN:

Be it known that:

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Country of U.S.A.

has invented a new and useful PALLET FRAME ASSEMBLY.

PALLET FRAME ASSEMBLY
BACKGROUND OF THE INVENTION

1. Field of the Invention

5 The present invention relates to a pallet frame assembly. More specifically, the present invention is directed toward a pallet frame assembly having reinforced corners.

2. Description of the Prior Art

10 During recent years, there has been a significantly large increase in the amount of freight or cargo transported by commercial airlines. While it has long been common practice to include the transport of freight on airlines, which are primarily directed to passenger service, there has been a significant increase in the airline industry of companies dedicated entirely to the transport of freight as opposed to passengers. A major contributing factor to this increase in the transport of air freight is the proliferation of air freight services which are directed to the express delivery of packages of all sizes, throughout the United States and overseas. Such express delivery services are offered not only by the U.S. Postal Service, but by private companies. All of the larger delivery companies, of the type set forth above and of standard commercial cargo, maintain an entire fleet of commercial aircraft wherein the individual airplanes have their interiors configured structurally to facilitate carrying the maximum freight or cargo.

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 The loading of air freight within the cargo compartment of an aircraft typically involves the use of pallets, available in a variety of different sizes, which are disposed in the aircraft and are otherwise designed to support and retain cargo thereon. A primary benefit to the use of such pallets is the ability to load a large volume of smaller items at one time, after they have been pre-loaded on the pallet at a remote location. Moreover, the pallet functions

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to maintain the items securely and uniformly retained on the aircraft. In particular, the supported load is typically maintained in its intended position on the pallet by means of some type of retaining cover or structure specifically designed to allow the maximum load to be placed on each pallet, while at the same time, assuring that the loaded cargo will not shift or be inadvertently displaced from the pallet during take-offs, landings or during the actual in-flight maneuvers of the aircraft.

It is of course widely known that the “balancing” of any load carried by aircraft, whether the load is comprised of a plurality of passengers, freight or a combination of both, is of primary importance for the safe and efficient operation of the aircraft. Any inadvertent shifting of the load or other significant redistribution of weight within the aircraft during flight, such as would be the result of inadvertent displacement of cargo or freight from its supported position on a pallet, could result in dangerous, unsafe flight conditions and threaten the safety of the aircraft, as well as the lives of the flight personnel and/or passengers.

In order to avoid any inadvertent displacement of air cargo or freight of the type set forth above, the aforementioned retainer structures or covers overlying the freight are removably but securely connected to the pallet base, in a manner which would normally prevent such displacement. Pallet structures of known or conventional design typically include a track, extending along at least a portion of the periphery thereof, which is specifically structured to securely fasten the retaining covers in their intended, overlying position, relative to the load or freight mounted on the pallet base. Due to the importance of eliminating any possibility of weight shift due to inadvertent displacement of freight or cargo within the interior of an aircraft, regulatory agencies such as the Federal Aviation Administration (FAA)

regularly and thoroughly examine the structural integrity of the pallet structures used to support and retain freight loads within an aircraft as discussed above.

One problem consistently found during such examinations is the failure of a significant number of pallet assemblies because the aforementioned retaining tracks have a tendency to become at least partially separated from the based of the pallet. Conventional of known pallet design and construction normally involves the use of closely spaced rivets or other applicable fasteners extending along the length and width of the track assembly and serving to securely anchor the track assembly to the base of the pallet. The aforementioned regular inspections all to often determine that the rivets become loosened or displaced, because of the tremendous stress or force placed thereon by the attached retaining covers during normal flight conditions. Moreover, the requirements of the regulatory agencies are so strict that even if only a small number of fasteners fail, the entire pallet must be taken off-line until repaired.

While some of the aforementioned problems were addressed in part, in the patent issued to the inventors herein, in U.S. Pat. No. 6,308,642, to Branam et al., still yet other problems persist. For example, while the invention taught in U.S. Pat. No. 6, 308,642 successfully eliminated the need for fasteners such as rivets, and the pallet disclosed therein works well for cargo loads of moderate weight, corner fatigue of the pallet track assemblies might result for pallets loaded with significant weight of cargo.

Therefore, there is a recognized need for a significant improvement in the design and structure of a pallet assembly designed to support and retain heavy loads of freight or cargo in a stable manner on the interior of aircraft or other vehicles. Such an improved pallet frame assembly should be structured to eliminate, as much as possible, the inadvertent

and/or partial detachment of a track assembly by minimizing the use of rivets or other fasteners that are susceptible to failure. In addition, such an improved pallet frame assembly should be designed to facilitate the assembly and manufacture of the various components associated with the pallet frame assembly in a manner that will prevent separation or partial detachment of the track assemblies at their corners, and thus increase the security and stability of the pallet pursuant to FAA guidelines.

SUMMARY OF THE INVENTION

The present invention is directed toward a pallet frame assembly of the type primarily, but not exclusively, designed to support and retain various loads with the interior of a commercial aircraft. Moreover, the pallet assembly maintains those loads in a manner which facilitates the removable but secure attachment of a load retaining cover or the like structure in overlying relation to the freight mounted on the base of the pallet.

More specifically, the pallet frame assembly of the present invention comprises a base formed preferably, but not necessarily, of a solid sheet of high strength, light weight material, such as, for example, metal. The base is connectable with a track assembly which forms a frame. The track assembly preferably comprises a plurality of track segments, and four segments are used for a pallet having a rectangular or square shape. Each of the track segments might also be formed of a light weight, high strength metal, or other suitable material. Each track segment terminates in a manner to abut another track segment in a perpendicular relationship, and each further comprises a channel to accept a substantially L-shaped bracket which is riveted, or otherwise securely fastened to the adjoining track segments. Each track segment is configured to have an extended inward edge over which the

interior of the bracket has a corresponding extension which overlaps the edge and thus secures each track segment together when the bracket is affixed to the respective segments. The track segment also has a channel near its outer edge into which a depending flange from the bracket is inserted. In this configuration the bracket securely fastens both the outer and inner edges of the track assembly once it is riveted in place. The resulting structure provides a pallet frame assembly with reinforced corner edges.

These and other features of the present invention will become more clear when the drawings as well as the detailed description are read together.

BRIEF DESCRIPTION OF THE DRAWINGS

For a more complete understanding of the nature of the present invention, reference should be had to the following detailed description taken in connection with the accompanying drawings in which:

FIG. 1 is a top plan view of an assembled pallet frame assembly of the present invention;

FIG. 2 is an exploded plan view of a corner section of the track assembly of an assembled pallet frame of the present invention;

FIG. 3 is a cross section view of the track assembly of an assembled pallet frame of the present invention taken at line 3-3 of FIG. 2;

FIG. 4 is a cross section view of the track assembly and corner bracket of an assembled pallet frame of the present invention taken at line 4-4 of FIG. 2;

FIG. 5 is a top plan view of the corner bracket of the present invention;

FIG. 6 is a bottom perspective view of the corner bracket of the present invention;

FIG. 7 is a cross section view of the corner bracket of the present invention taken at line 7-7 of FIG. 5; and

FIG. 8 is a cross section view of the corner bracket of the present invention taken at line 8-8 of FIG. 5.

DETAILED DESCRIPTION OF A PREFERRED EMBODIMENT

As shown in the accompanying figures, the present invention is directed towards a pallet frame assembly 10. The pallet frame assembly 10 is of the type that is capable of supporting and retaining a load, in the form of freight or cargo, and more particularly, is preferably configured to be securely disposed within the interior cargo compartment of an aircraft.

More specifically, the pallet frame assembly 10 comprises a base 12 as shown in FIGS. 1, 3 and 4. The base preferably, but not necessarily, is formed from a solid, one-piece construction. The base may be made of any light weight, high strength material such as metal. The base 12 terminates with edges 14 that are matably fitted within the recess 16 of the inner edge of the track assembly 20. While there are other well known methods for securely fastening a base member to a track assembly of a pallet, this method disclosed herein, and disclosed in U.S. Pat. No. 6,308,642 works well for the intended purpose without the need or use of fasteners such as rivets.

More specifically, the track assembly 20 comprises at least one, but preferably a plurality of track segments 22 shown in mounted or assembled form on the pallet frame assembly 10 in FIG. 1 and shown in detail in FIGS. 2, 3 and 4. Each of the one or more track segments 22 comprises an elongated configuration, preferably corresponding in length to the

base edge 14 of base 12 to which it is attached. Each segment 22 preferably comprises an at least partially hollow interior portion where, as preferred, the track segments are made of an extruded metal. However, if desired, each track segment need not have an interior hollow portion, if reduced weight of the overall pallet frame assembly 10 is not at issue. Additionally, the individual track segments 22 may also be defined by a channel 24. The channel 24, which is preferably, but not necessarily a single continuous structure, includes a channel interior 26 which communicates directly with a plurality of spaced apart apertures 28, as best shown in FIG. 2. Each of the apertures 28 are separated by a narrowed portion 30 having a lesser transverse dimension than the diameter or equivalent transverse dimension of the apertures 28. The channel 24 is structured, dimensioned and configured to accommodate the removable but fixed retention of a connector or other structure secured to and/or associated with a load retaining structure, such as a net or straps (not shown) which, as detailed above, is maintained in a covering, retaining relation to any load supported on the base 12 in the conventional fashion. As can be appreciated, the apertures 28 and/or other structure at which the load retaining structure is secured may include a variety of different configurations, and may be defined only at fixed securement points rather than as a continuous elongate structure. Still, however, the channel interior 26 which defines each portion or all of the channel 24 fastening points also preferably extends through the end of the track segment 22.

As shown in FIG. 2A, the track segment 22 is further defined as terminating in ends 40 and having an outer periphery 42 and an inner periphery 44. At each end on the outer periphery 42 of the track segment 22 is a slot 44 into which a bracket 50 is inserted.

The bracket 50 is employed to secure adjoining track segments 22 together at

the corner 52 of the pallet frame assembly 10; in this regard, four brackets 50 are used to secure four track segments 22 to form a square or rectangular shaped pallet frame assembly 10. As more fully shown in FIGS. 5-8, the bracket is generally L shaped, and formed of a light weight, high strength material such as metal. A plurality of apertures 54 are interspersed on each leg 56 and 56' of the bracket 50 for insertion thereof of an equal number of rivets 57 that are used to secure the track segments 22 together, and to secure the bracket 50 to the track segments 22 to form the pallet frame assembly 10. It is preferred that four apertures 54 and four rivets 57 are used to secure the bracket 50 to the track segments 22. A flange 58 and 58' depends from the rear edge of each leg 56 and 56', respectively, at substantially a ninety degree, or substantially perpendicular, bend relative to the top 60 of the bracket 50. These legs, 56 and 56', are configured to fit within the slots 46 of the track segments 22. The interior of the bracket has a lip or extension 62 and 62' of top 60 such that the length of the top 60 along the extensions 62 and 62' is greater than the length of the top 60 where there are no extensions 62 and 62'. Moreover, flanges 64 and 64' are disposed on the forward edge of each leg 56 and 56', respectively. Flanges 64 and 64' depend from the top 60 of bracket 50 at substantially ninety degrees, or substantially perpendicular, relative to the top 60. Flanges 64 and 64' have a length shorter than the length of flanges 58 and 58', but they are sufficient in length such that when bracket 50 is placed onto the track segments 22, the flanges 64 and 64' fit within the channel 24 and the extensions 62 and 62' rest on top of the narrowed channel portion 30 to secure two adjacent track segments 22 together.

Since many modifications, variations and changes in detail can be made to the described preferred embodiment of the invention, it is intended that all matters in the foregoing

description and shown in the accompanying drawings be interpreted as illustrative and not in a limiting sense. Thus, the scope of the invention should be determined by the appended claims and their legal equivalents.